



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,265	11/17/2003	Thomas Pun	APL.P0037	6487

62224 7590 10/12/2007
ADELI LAW GROUP, A PROFESSIONAL LAW CORPORATION
1875 CENTURY PARK EAST
SUITE 1360
LOS ANGELES, CA 90067

EXAMINER

WERNER, DAVID N

ART UNIT	PAPER NUMBER
----------	--------------

2621

MAIL DATE	DELIVERY MODE
-----------	---------------

10/12/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/716,265

Applicant(s)

PUN ET AL.

Examiner

David N. Werner

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☒ Claim(s) 31-36 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2007 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20070803.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office action for US Patent Application 10/716,265 is responsive to communications filed 02 August 2007, in reply to the Office action of 28 March 2007. Currently, claims 1-36 are pending. Of those, claims 29-36 are new. In the previous Office action, claims 1, 4, 6, and 19 were provisionally rejected for non-statutory obvious-type double patenting over co-pending Application 10/716,316, claims 2-4 and 6-13 were rejected under 35 U.S.C. 112, second paragraph as indefinite, claims 16-28 were rejected under 35 U.S.C. 101 as non-statutory, claims 1-28 were rejected under 35 U.S.C. 101 as lacking patentable utility, claims 1-10 and 14-25 were rejected under 35 U.S.C. 102(b) as anticipated by US Patent 6,160,846 B1 (Chiang et al.), claims 12, 13, 27, and 28 were rejected under 35 U.S.C. 103(a) as obvious over Chiang et al., and claims 11 and 26 were rejected under 35 U.S.C. 103(a) as unpatentable over Chiang et al. in view of US Patent 7,079,581 B2 (Noh et al.) In addition, the drawings and specification were objected to on formalities.

Response to Arguments

2. Applicant has itemized adverse elements of the prior Office Action in presenting arguments. These arguments will be discussed below in accordance with the applicant's arrangement.

I. Objections to Drawings

Additional drawing sheets were received on 02 August 2007. These drawings are acceptable. The objection to the drawings as incomplete for not showing every feature of the claimed invention is withdrawn.

Applicants' arguments with respect to the drawings have been fully considered and are persuasive in part. The objection to figure 2 as not labeled as "Prior Art" is withdrawn. However, even though applicant states in section I of the arguments that the present invention operates on the apparatus illustrated in figure 1, the statement on page 8, lines 14-15 of the specification stating that "Figure 1 illustrates a high level block diagram of a **typical** digital video encoder 101 **as is well known in the art**" (emphasis added) precludes withdrawal of the objection to figure 1 as not labeled as prior art. The reference to figure 1 in the specification admitting it to be prior art must be removed before this objection may be withdrawn. Preferably, the statement on page 7, line 6 should also indicate that the apparatus illustrated on figure 1 is according to an embodiment of the present invention. Therefore, the objection to figure 1 is respectfully maintained.

II. Objection to the Abstract

Applicant's amendment to the abstract has been fully considered. The objection to the abstract for length has been withdrawn.

III. Objections to the Specification

Applicant's amendments to the specification have been fully considered. The objections to the specification have been withdrawn.

IV. Double Patenting Claim Rejections

At Applicant's request, the double-patenting rejection of claims 1, 4, 16, and 19 has been held in abeyance until allowable subject matter is indicated.

V. Rejection of claims 2-4 and 6-13 under 35 U.S.C. 112, second paragraph

Applicant's amendments to the claims have been fully considered. The rejection of claims 2-4 and 6-13 as lacking antecedent basis has been withdrawn.

VI(a). Rejection of Claims 16-28 under 35 U.S.C. 101 as Non-Statutory

Applicant's amendments to claims 16 and 20 have been fully considered. The rejection of claims 16-28 as directed to non-statutory subject matter has been withdrawn.

VI(b). Rejection of Claims 1-28 under 35 U.S.C. 101 as Lacking Patentable Utility

Applicant's amendments to claims 1, 5, 16, and 20 have been fully considered. The rejection of claims 1-28 as lacking patentable utility has been withdrawn.

VII. Rejection of claims 1-4 under 35 U.S.C. 102(b)

Applicant's arguments with respect to claims 1-4 have been fully considered but they are not persuasive. Applicant argues that Chiang et al. does not disclose the claimed features of "determining a buffer occupancy accumulator as a difference between an actual amount of bits used and a requested amount of bits" or "limiting amount of change in a buffer occupancy accumulator based on frame properties" in claim 1.

The examiner respectfully disagrees with this assertion. Figure 1 of Chiang et al. shows a video encoder having buffer 190 and rate control module 130. The rate control module 130 monitors and adjusts the bit rate of data entering buffer 190 to control the number of bits generated by the encoder (column 8: lines 49-55). Then, rate control module 130 corresponds with the claimed "buffer occupancy accumulator". In one embodiment of Chiang et al., illustrated in figure 4, the data resulting from an encoding process is used to compute the quantizer scale for the next macroblock. In step 415, a buffer fullness measure R_i is calculated as $R_i = R_o + B_{i-1} - \frac{T^*(i-1)}{N_{MB}}$, in which the first term is the initial buffer fullness measure, the second term is the number of bits encoded in the previous macroblocks in the present frame, and the third term is the budgeted number of bits per macroblock in the present frame (column 13: lines 42-57). This calculation corresponds with the claimed "difference between an actual amount of bits used and a requested number of bits".

The buffer fullness measure R_i is specifically set so that the buffer does not underflow or overflow (column 13: lines 60-63), thus limiting change in buffer fullness.

Art Unit: 2621

Since this buffer fullness measure depends on the size of the picture in bits, and picture size is considered an "inherent or distinctive characteristic or trait" or "attribute" of the picture, picture size is considered a "property" of the picture according to the IEEE definition, and so a "frame property" affects buffer fullness measure R_i . Therefore, the examiner respectfully maintains the rejection of claims 1-4 based on Chiang et al.

VIII. Rejection of claims 5-10 under 35 U.S.C. 102(b) and 11-13 under 35 U.S.C. 103(a)

Applicant's arguments filed 03 August 2007, with respect to the rejection(s) of claim(s) 5-10 under 35 U.S.C. 102(b) and claims 11-13 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection in view of US Patent 6,167,085 A (Saunders et al.).

Applicant argues that Chiang et al. does not disclose the claimed features of "determining a base quantizer value", "determining a quantizer adjustment based on frame properties", and "computing a quantizer value as a sum of the base quantizer value and the quantizer adjustment". Although in one embodiment of Chiang et al., a quantizer scale Q_i is multiplied by a modifier to produce an optimal quantizer value (column 12: lines 29-39), it does not teach producing a quantizer value as a sum of a base value and an adjustment value.

IX. Rejection of claims 14-15 under 35 U.S.C. 102(b)

Applicant's arguments with respect to claims 14 and 15 have been fully considered but they are not persuasive. Applicant argues that Chiang et al. does not disclose the claimed features of "determining a delta value that includes a difference between a difference between a number of bits actually used and a number of bits that should have been used" or "determining a quantizer in which a number of bits that should have been used is dependent on a frame type".

The examiner respectfully disagrees with this assertion. As previously mentioned, in the figure 4 embodiment of Chiang et al., buffer fullness measure R_i is calculated as $R_i = R_o + B_{i-1} - \frac{T^*(i-1)}{N_{MB}}$, in which the first term is the initial buffer fullness measure, the second term is the number of bits encoded in the previous macroblocks in the present frame, and the third term is the budgeted number of bits per macroblock in the present frame (column 13: lines 42-57). Then, $R_o + B_{i-1}$ is "a number of bits actually used", and $\frac{T^*(i-1)}{N_{MB}}$ is "a number of bits that should have been used", and the difference therefrom is a "delta value". This delta value R_i is then additionally used to determine a quantizer scale Q_i for the current macroblock (column 13: line 67–column 14: line 2). Since there is a target bit rate for each frame type (column 13: lines 37-41), and the quantizer scale Q_i depends on delta value R_i , which in turn depends on target bit rate T , Chiang et al. discloses a quantizer in which a number of bits that should have been used is dependent on a frame type. Therefore, the examiner respectfully maintains the rejection of claims 14-15 based on Chiang et al.

X. Rejection of claims 16-19 under 35 U.S.C. 102(b)

Applicant's arguments with respect to claims 16-19 have been considered but they are not persuasive. Applicant's arguments are substantially similar to those of claims 1-4, which are co-extensive in scope, and have accordingly been rejected using the same grounds in the previous Office action. For the reasons described with respect to claims 1-4 in section VII above, this rejection is respectfully maintained.

XI. Rejection of Claims 20-25 under 35 U.S.C. 102(b) and 26-28 under 35 U.S.C. 103(a)

Applicant's arguments filed 03 August 2007, with respect to the rejection(s) of claim(s) 20-25 under 35 U.S.C. 102(b) and claims 26-28 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of US Patent 6,167,085 A (Saunders).

Applicant argues that Chiang et al. does not disclose the claimed features of "determining a base quantizer value", "determining a quantizer adjustment based on frame properties", and "computing a quantizer value as a sum of the base quantizer value and the quantizer adjustment" in claim 20. Although in one embodiment of Chiang et al., a quantizer scale Q_i is multiplied by a modifier to produce an optimal quantizer value (column 12: lines 29-39), it does not teach producing a quantizer value as a sum of a base value and an adjustment value.

XII. New claims 29-36

These claims are fully supported by the specification. It is noted that claims 29 and 30 are directed to a software embodiment of the method of claims 14 and 15.

Priority

3. Since applicant desires to call attention to related co-pending applications 10/427,669, 10/427,843, and 10/716,316, as stated on the Information Disclosure Statement of 03 August 2007, a specific cross-reference to these applications in compliance with 37 CFR 1.78(a)(2)(i) must be included in the first sentence(s) of the specification following the title or in an application data sheet.

Drawings

4. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claims 31-36 are objected to because of the following informalities: the word "of" should be inserted between the words "one" and "an". Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 14-19, 29-32, and 34-35 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,160,846 A (Chiang et al.). Chiang et al. teaches a system for encoding a video that selects a quantizing scale to maintain video quality. Regarding claim 1, figure 1 of Chiang et al. shows encoder 100 with rate control module 130 that monitors and adjusts the bit rate of the data stream entering buffer 190 to prevent buffer overflow and underflow (column 8: lines 48-55). This corresponds with the claimed "buffer occupancy accumulator". Rate control module 130 adjusts the quantizer scale based on the complexity of a frame (column 8: line 64–column 9: line 21), and attempts to maintain an optimal bit rate that preserves image quality (column 8: lines 56-63). In one embodiment of Chiang et al., illustrated in figure 4, the data resulting from an encoding process is used to compute the quantizer scale for the next macroblock. In step 415, a buffer fullness measure R_i is calculated as

Art Unit: 2621

$R_i = R_o + B_{i-1} - \frac{T^*(i-1)}{N_{MB}}$, in which the first term is the initial buffer fullness measure, the second term is the number of bits encoded in the previous macroblocks in the present frame, and the third term is the budgeted number of bits per macroblock in the present frame (column 13: lines 42-57). This calculation corresponds with the claimed "difference between an actual amount of bits used and a requested number of bits". The buffer fullness measure R_i is specifically set so that the buffer does not underflow or overflow (column 13: lines 60-63), thus limiting change in buffer fullness. Since this buffer fullness measure depends on the size of the picture in bits, and picture size is considered an "inherent or distinctive characteristic or trait" or "attribute" of the picture, picture size is considered a "property" of the picture according to the IEEE definition, and so a "frame property" affects buffer fullness measure R_i . Chiang et al. then calculates a quantizer value for the current macroblock based on R_i (column 13: line 67–column 14: line 6), and encodes the macroblock with this quantizer (column 14: lines 8-11).

Regarding claim 2, the calculation for R_i is based on a target bit rate T , and there are separate values of T for the various picture types (column 13: lines 37-41).

Regarding claim 3, in an emergency situation, to prevent immanent buffer overflow, Chiang et al. discards high-frequency DCT coefficients of a block and only transmit low-frequency coefficients, in order to reduce bit rate (column 2: lines 9-15).

Regarding claim 4, normally, buffer fullness measure R_i is used to establish a quantizer scale value that varies depending on buffer fullness (column 13: lines 60-65).

Regarding claim 14, in the figure 4 embodiment of Chiang et al., buffer fullness measure R_i is calculated as $R_i = R_o + B_{i-1} - \frac{T^*(i-1)}{N_{MB}}$, in which the first term is the initial buffer fullness measure, the second term is the number of bits encoded in the previous macroblocks in the present frame, and the third term is the budgeted number of bits per macroblock in the present frame (column 13: lines 42-57). Then, $R_o + B_{i-1}$ is "a number of bits actually used", and $\frac{T^*(i-1)}{N_{MB}}$ is "a number of bits that should have been used", and the difference therefrom is a "delta value". This delta value R_i is then additionally used to determine a quantizer scale Q_i for the current macroblock (column 13: line 67–column 14: line 2). Since there is a target bit rate for each frame type (column 13: lines 37-41), and the quantizer scale Q_i depends on delta value R_i , which in turn depends on target bit rate T , Chiang et al. discloses a quantizer in which a number of bits that should have been used is dependent on a frame type.

Regarding claim 15, again, there is a different target bit rate T for different frame types. Since inter-macroblocks may only appear in inter-frames, it is inherent that inter-macroblocks use a different target bit rate than intra-macroblocks in intra-frames.

Regarding claims 16-19 and 29-30, Chiang et al. discloses a software embodiment of the invention (claims 18-23).

Regarding claims 31-32 and 34-35, an MPEG-encoded video is comprised of I-frames, which are intra-frame encoded, and B and P frames, which are inter-frame encoded (column 4: line 44; column 6: lines 25-31).

Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,167,085 A (Saunders et al.). Saunders et al. is directed to an image coder. Regarding claim 5, a bit allocator in Saunders et al. receives DCT data for a current block and performs trial quantizations on 10 base values in parallel, and determines the most appropriate base quantization level (column 5: lines 16-35). This corresponds with the claimed "determining a base quantizer value". Then, a binary search unit performs additional trial quantizations on quantization levels near the selected base quantization level (column 5: lines 45-50). These further quantization levels are in a range of -3 to +4 relative to the base quantization level. The adjustment quantization level selected is determined as the smallest quantization level that produces fewer than a target amount of bits (column 9: lines 42-43). The target bit size is, in turn, determined based on an "activity level" of the block (column 7: lines 20-27), which is a measure of complexity or ease of coding (column 4: lines 52-67). Then, determining the refinement quantization level based on an activity value corresponds with the claimed "determining a quantizer adjustment based on frame properties". The quantization level, determined as a relative differential to a base quantization level, is passed with the DCT block to a quantizer for quantization (column 5: lines 56-59). This corresponds with the claimed "encoding said digital video information based on a quantizer value computed as a sum of the base quantizer value and the quantizer adjustment".

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5-10, 12-13, 20-25, 27, 28, 33, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,160,846 A (Chiang et al.) in view of US Patent 6,167,085 A (Saunders et al.). Claims 5 and 20 are directed to encoding digital video using a quantizer value calculated as the sum of a base quantizer value and quantizer adjustment. Chiang et al. does not teach this feature.

Saunders et al. is directed to an image coder. Regarding claim 5, a bit allocator in Saunders et al. receives DCT data for a current block and performs trial quantizations on 10 base values in parallel, and determines the most appropriate base quantization level (column 5: lines 16-35). This corresponds with the claimed "determining a base quantizer value". Then, a binary search unit performs additional trial quantizations on quantization levels near the selected base quantization level (column 5: lines 45-50). These further quantization levels are in a range of -3 to +4 relative to the base quantization level. The adjustment quantization level selected is determined as the smallest quantization level that produces fewer than a target amount of bits (column 9: lines 42-43). The target bit size is, in turn, determined based on an "activity level" of the block (column 7: lines 20-27), which is a measure of complexity or ease of coding (column 4: lines 52-67). Then, determining the refinement quantization level based on

Art Unit: 2621

an activity value corresponds with the claimed "determining a quantizer adjustment based on frame properties". The quantization level, determined as a relative differential to a base quantization level, is passed with the DCT block to a quantizer for quantization (column 5: lines 56-59). This corresponds with the claimed "encoding said digital video information based on a quantizer value computed as a sum of the base quantizer value and the quantizer adjustment".

Chiang et al. discloses the claimed invention except for determining a quantization level for a block as a base quantization level and an adjustment quantization level. Saunders et al. teaches that it was known to determine a quantization level for a block based on a coarse quantization estimate and a refined quantization calculation. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the encoder of Chiang et al. to include the iterative quantization level determination apparatus of Saunders et al., since Saunders et al. states in column 1: lines 50-67 that such a modification would increase the speed of determining the optimum quantization level for a current macroblock.

Regarding claim 6, in Chiang et al., I-frames, P-frames, and P-frames have different target bit levels (column 13: lines 37-41).

Regarding claims 7 and 8, in Chiang et al., a buffer fullness measure depends on the sum of bits generated by encoding the previous macroblocks in the frame (column 13: lines 53-54).

Regarding claim 9, in Chiang et al., buffer fullness measure R_i is determined as the difference between the number of bits in a frame and the target bit budget for the frame (column 13: lines 42-59).

Regarding claim 10, in Chiang et al., there is a different target bit rate T for different frame types (column 13: lines 37-41). Since inter-macroblocks may only appear in inter-frames, it is inherent that inter-macroblocks use a different target bit rate than intra-macroblocks in intra-frames.

Regarding claim 12, in a further embodiment of Chiang et al., shown in figure 2, step 230 calculates a modifier γ for the quantizing step Q_i . This is a bit activity index ratio, calculated by dividing the estimated number of bits needed to encode the picture by the target number of bits (column 12: lines 29-32).

Regarding claim 13, in Saunders et al., the base quantization scale is kept in a range from 1 to 64 (column 7: lines 25-27).

Regarding claims 20-25 and 27-28, Chiang et al. discloses a software embodiment of the invention (claims 18-23).

Regarding claims 33 and 36, an MPEG-encoded video is comprised of I-frames, which are intra-frame encoded, and B and P frames, which are inter-frame encoded (column 4: line 44; column 6: lines 25-31).

9. Claims 11 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. in view of Saunders et al. as applied to claims 5 and 20 above, and further in view of US Patent 7,079,581 B2 (Noh et al.).

Claims 11 and 26 teach adjusting a quantizer value in a video encoder based on the normalized sum of absolute differences. Although Chiang et al. teaches motion compensation, this is not necessarily factored into calculating a quantization scale. Noh et al. teaches an apparatus and method for controlling a variable bit rate for a video encoder in real time. Regarding claims 11 and 26, Noh et al. discloses a variable bit rate (VBR) controller that determines a quantization factor for a video encoder based on frame complexity (column 1, lines 45-56). Figure 1 of Noh et al. shows encoder 100 with VBR controller 50, which contains Mean Absolute Difference (MAD) calculator 51. The MAD value for a frame is directly used to model complexity of the frame (column 3, lines 48-49). This result is used as an input for target bit rate decision unit 52 and quantization factor decision unit 54 (column 3, lines 61-64).

Chiang et al., in combination with Saunders et al., discloses the claimed invention except for determining a quantizer scale based on a sum of absolute differences. Noh et al. teaches that it was known to determine a quantization factor based on mean absolute difference. Therefore, it would have been obvious for one having ordinary skill at the time the invention was made to set a quantizer according to an absolute difference calculation as taught by Noh et al., since Noh et al. states in column 3, lines 31-34 that such a modification would "[minimize] deterioration of the quality of an image while increasing the encoding efficiency" (column 3, lines 31-34).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 6,831,947 B2 (Corbera) teaches an adaptive video quantization method. European Patent Application Publication 1,091,588 A1 (Hiranaka et al.) teaches an image encoder that can produce VBR video or CBR video by changing a quantizing scale.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571) 272-

Art Unit: 2621

9662. The examiner can normally be reached on Monday-Friday from 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri, can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DNW

Mehrdad Dastouri
MEHRDAD DASTOURI
SUPERVISORY PATENT EXAMINER
TC 2600